WHAT IS CLAIMED IS:

1. A computer-implemented method for separating a three-dimensional polygonal structure, comprising:

determining a continuous curve on the surface of the structure; and

separating the structure into two objects based on the continuous curve.

2. The method of claim 1, wherein determining the continuous curve comprises:

selecting two points on the polygonal structure; and

determining a piece-wise continuous curve on the surface of the structure based on the two points

3. The method of claim 2, wherein the determining a piece-wise . continuous curve on the surface of the structure comprises:

calculating a local curvature for each edge of the structure;

generating a cost function based on the local curvature and length of the edge; and

determining the shortest path based on the cost function.

4. The method of claim 3, further comprising generating a set of control points to create a fitting surface based on the shortest path.

5. The method of claim 4, further comprising applying the fitting surface to separate the structure into two portions.

6. The method of claim 4, wherein the fitting surface is expressed as a function.

7. The method of claim 4, wherein the fitting surface is expressed as a spline function.

8. The method of claim 4, wherein the fitting surface is interactively adjusted.

9. The method of claim 5, further comprising interactively highlighting a separated portion.

10. The method of claim 5, further comprising interactively highlighting a border of the portion.

11. The method of claim 4, further comprising determining a shortest path between the points and the fitting surface.

12. The method of claim 4, further comprising minimizing the curvature along the fitting surface.

13. The method of claim 4, wherein the fitting surface is adjusted by moving one or more points on the object.

14. The method of claim 4, wherein the cutting surface is adjusted by moving one or more nodes.

15. The method of claim 4, wherein the cutting surface is adjusted by:
specifying a point on the cutting surface and between two nodes; and
adjusting the point to vary the cutting surface.

16. The method of claim 1, wherein the structure comprises one or more teeth.

17. The method of claim 1, wherein a shortest path is used to segment the structure into two portions.

18. The method of claim 1, further comprising:
displaying a plane having a surface specified by a plurality of nodes;
adjusting one or more nodes to modify the surface of the plane; and
applying the plane to the structure.

19. The method of claim 18, further comprising providing a handle to adjust each orientation of the plane.

20. The method of claim 19, wherein adjusting one or more nodes further comprises dragging and dropping the one or more nodes.

21. The method of claim 19, wherein the flexible plane surface is formed using a function applied over a two dimensional plane.

22. The method of claim 21, wherein the function is represented as bicubic Bézier patches.

23. The method of claim 1, wherein the object is two joined teeth to be separated, further comprising:

receiving an initial digital data set representing the two joined teeth,

representing the two joined teeth as a teeth mesh;

applying a fitting surface to the teeth mesh;

identifying an intersecting line between the teeth mesh and fitting surface; and

generating two separated teeth based on the intersecting line.

24. The method of claim 23, further comprising rendering a three-dimensional (3D) graphical representation of the separated teeth.

25. The method of claim 23, further comprising receiving an instruction from a human user to modify the graphical representation of the teeth and modifying the graphical representation in response to the instruction.